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ABSTRACT

This booklet, the first in a series, reports the results of a year-long research project conducted in an experimental school associated with the Learning Research and Development Center, University of Pittsburgh. Using a variety of techniques drawn from anthropology and psychology, the investigator elicited a cognitive map of school activities from intermediate grade pupils. This taxonomy of activities was then used to describe the school from the pupils' point of view. The taxonomy was refined and validated through the use of a similarities judgment instrument, and several analytical schemes were applied to this data. Finally, the intermediate grade pupils were each observed in a variety of school settings, and their behavior was coded on a scale that was derived from the activities taxonomy. The results of this observation scale are presented and discussed in terms of the relative frequencies of the activities over settings and over pupils. The summary lists five conclusions: (1) it is indeed possible to study a school anthropologically; (2) by focusing on beliefs or what is in peoples heads it is also possible to obtain a reasonable picture of the culture of interest; (3) while elementary school students think as a group, their behavior does not always conform to the group behavior; (4) open-ended, loosely structured interviews with a few individuals can indeed provide cultural information about a group; and (5) our collective ignorance of schools is such that it is possible for a researcher to enter a school with a very open agenda and come out with some discoveries. (Author/DMT)

LEARNING RESEARCH AND DEVELOPMENT CENTER

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Abstract

This paper, the first in a series, reports the results of a year-long research project conducted in an experimental school associated with the Learning Research and Development Center, University of Pittsburgh. Using a variety of techniques drawn from anthropology and psychology, the investigator elicited a cognitive map of school activities from intermediate grade pupils. This taxonomy of activities was then used to describe the school from the pupils' point of view. The taxonomy was refined and validated through the use of a similarities judgment instrument, and several analytical schemes were applied to this data. Finally, the intermediate grade pupils were each observed in a variety of school settings, and their behavior was coded on a scale which was derived from the activities taxonomy. The results of this observation scale are presented and discussed in terms of the relative frequencies of the activities over settings and over pupils.

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Behavior depends on the Image
. . . Kenneth Boulding, *The Image*

The research project described in this and subsequent reports began as an attempt to understand and describe anthropologically an experimental[1] (or, developmental) school. This school is a medium-sized, suburban elementary school located near Pittsburgh, Pennsylvania. For convenience, this school will be called Longbranch.[2] Longbranch is, in many respects, a typical elementary school. The population of pupils is drawn from a single community and is composed of white children from predominantly middle-class families. There are two classes at

[1]In most LRDC publications, Longbranch is referred to as a developmental school. *Developmental* has the partial connotation that the pupils are somehow abnormal and that the school is trying to "help" them to develop. *Experimental* conveys exactly the atmosphere of closely monitored change, the testing of ideas, and investment for the good of a group larger than the resident population, etc., which is characteristic of Longbranch.

[2]To insure their anonymity, actors in the school are either not mentioned by name or are given pseudonyms. *Longbranch* is a pseudonym.

each grade level from kindergarten through grade 5. The school is administered and staffed in the customary manner. Other normal features of this school will emerge in the course of my description.

In other respects, Longbranch is far from typical because it has had a close relationship, since its founding ten years ago, with the Learning Research and Development Center (LRDC) at the University of Pittsburgh. The Center has developed and implemented in this school a number of innovative instructional programs, including individualized curricula in reading, math, and spelling; computer-assisted instruction; an Individualized Science lab; and a self-management system that gives students considerable freedom in planning the course of their day at school. Longbranch, then, is here considered as a member of the species *experimental schools* and, more particularly, as a school in which the phrase *individualized instruction* characterizes both the philosophy and means of its operation.[3]

Anthropology in an Experimental School

To study any living community anthropologically implies at least two things. First, it implies the use of a method commonly called fieldwork. As a method, fieldwork is characterized by the researcher remaining in close contact with the people under investigation, even if he resorts to instruments to gather and analyze the data. It is also characteristic of

[3]For a more extended description of the theory and practice of individualized instruction, see Glaser (in press).

fieldwork that the investigator is foreign to the group he is studying. As an adult in a child-centered society, the field-worker in a school is indeed a foreigner.

A second implication of an anthropological approach is a theoretical concern dominated by the construct culture. There is little agreement, however, among anthropologists on a definition of culture. Spradley (1972) offers an excellent short review of definitions of culture up to the present time. Two kinds of definitions reflect current attempts by several scholars to retain the culture construct in the face of pluralistic, multi-cultural societies:

> The "behavioral definition" focuses upon observable patterns of behavior within some social group. . . . The "cognitive definition," on the other hand, excludes behavior and restricts the culture concept to ideas, beliefs and knowledge. (Spradley, 1972, p. 6)

From my vantage point, both behavior and beliefs are of interest, and of particular interest is the interaction of the two. I understand culture, then, to be the belief system and behavior patterns of a social group.

I was, from the outset, interested in the beliefs and behaviors of one particular group in the school, namely, the pupils. Given the enormous effort that had gone into the creation of the experimental school, I was anxious to discover how pupils themselves characterized this effort on their behalf. Because my method would heavily rely on interviews, I chose to work exclusively with pupils in the intermediate grades on the

assumption that they would be more articulate about their beliefs than younger pupils. The aim of this project, therefore, was to describe, analyze, and interrelate the beliefs and behaviors of fourth and fifth graders in an experimental school.

The Study of Beliefs and Behaviors

If the construct of culture suffers from a multiplicity of definitions, the construct of belief suffers from a multiplicity of analogous constructs masquerading under various names, each with its own definition. However, an excellent general definition of belief is provided by Bem (1970): "If a man perceives some relationship between two things or between something and a characteristic of it, he is said to hold a belief. . . . Collectively a man's beliefs compose his understanding of himself and his environment" (pp. 4-5). In the most comprehensive review of the field to date, Borhek and Curtis (1975) list seven elements as crucial in defining and delimiting belief systems. In my research, their fourth element, perspective, or *cognitive map*, receives major attention. "The perspective, or cognitive map, may consist of nothing more than a classification or set of conceptual tools. Often it forms though by calling attention to the environment through the classification itself" (p. 11).

I will argue that to fully understand the *school life* of pupils it is necessary to study both their beliefs with respect to school and their behaviors within the school setting. Diverse bodies of scholarship have begun to converge in this area and help to show how the beliefs and behaviors of social groups

might be related. Stephen Kaplan (1973) reviews and extends the findings of several generations of psychological research on cognition and concludes that men must have cognitive maps.* Given that Man, as a species, understands his environment, this understanding can only come about through the structured representation of the environment in his mind. To survive and evolve as he has, man has had to abstract (often symbolically in language) features of the environment and organize these features in a systematic way. Scholars in the field of artificial intelligence have begun to speculate on and simulate (on a computer) the actual structure of these cognitive maps, or what Newell and Simon (1972) have called "problem spaces." Minsky (1974) has studied "frames," which, conceptually at least, resemble cognitive maps and which he defines as "a data structure for representing a stereotyped situation" (p. 1). He describes possible configurations for frames that handle the data of visual imagery and the data of language units.

In this study, I will be working with beliefs like the following: "A tree is a type of plant," "There are evergreen trees and trees that lose their leaves," and "Some trees that lose their leaves are fruit trees." These beliefs are organized into a cognitive map that can be well represented as a taxonomy.

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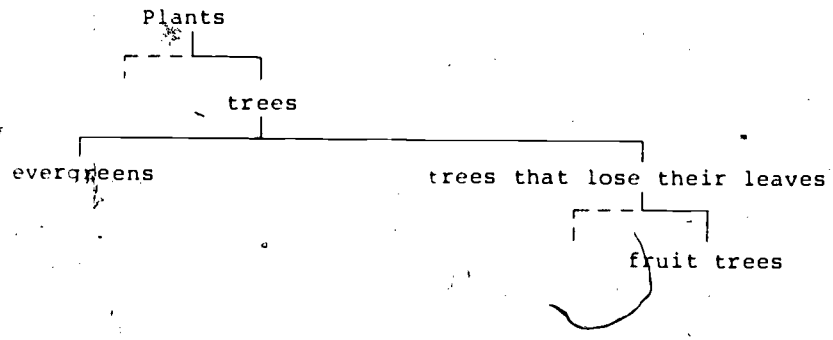
*In this paper, the term *map* is used metaphorically. This raises some problems because others have used it more literally (in *cognitive map*) in recent publications. See, for example, several of the articles in Downs and Stea (1973).



Like the world of plants, the experimental school is composed of many things, and this study will probe the ways that pupils organize these things into cognitive maps of school life, or taxonomies of things they encounter in school.

Similarly, Berger and Luckman (1967) synthesize and extend a theory which dates back at least to Husserl: that *reality is* [illegible]. Man cannot know or describe his environment except as it is organized into cognitive maps in his own mind. More than this, Man as a social animal learns to construct reality as others around him do. Social groups are characterized, then, as constellations of individuals with highly congruent belief systems or highly similar ways of constructing reality. Pupils are not handed cognitive maps of the school on the first day of class. Rather, they must construct these maps as they go along, influenced, at least in part, by what their peers say about and do in school. The map contains a pupil's assumptions about the school, its rules, routines, requirements, and so on. New things or situations are comfortably fitted into appropriate

nodes of the taxonomy to the extent that they are similar to old things. School life shapes the pupils' map, and the map, in turn, guides their view of and behavior in the school environment.

I treat pupils as actors who construct and share the reality of Longbranch. In this context, I wanted to ask a series of questions about the reality construction process: What is the content and structure of fourth and fifth graders' cognitive map(s) of Longbranch? Is there a single, widely shared map (giving evidence of a social group rather than a mere aggregate of individuals), or many idiosyncratic maps? What underlies this map in terms of a few highly salient dimensions, or what might be called substantive beliefs (Borhek & Curtis, 1975, p. 12)? What is the relationship between the map as a "guide for behaving" and the actual behavior of pupils in the environment?

Actors and Reality Construction

During the course of a year, Longbranch plays host to many visitors. These visitors are drawn to Longbranch because of its experimental status. Before visiting the school, many of these people have undoubtedly read several articles written by LRDC staff that describe the design, implementation, and evaluation of the instructional systems used in Longbranch. The visitors are guided on their tour by a representative of the Center whose other duties encompass both the facilitation of LRDC's work and the smooth functioning of the school as a whole. They

may also have an opportunity to talk informally with teachers, pupils, and their parents (who also regularly visit). I often wondered what kind of impression these visitors carried away with them. At the least, they must have been impressed by the diverse community of individuals who contribute to the school life of Longbranch. Each actor in the community, whether teacher, researcher, developer, parent, or pupil, will be associated with a different set of tasks and also a different set of beliefs about school life.

One group of actors, pupils, serves as the subject of this report, and other actors in the Longbranch community will serve as its audience. There are several reasons why this project will be of interest to an audience of role-playing individuals (or actors) who are involved with Longbranch. First, by taking the pupil's perspective, a view of school life is exposed for the first time. Researchers consult with teachers and vice-versa; the school communicates with parents in various ways; but pupils lack such formal opportunities for expression. It is highly likely that the pupils' perspective or beliefs will differ significantly from that of other actors involved with the school. Cicourel and his associates (1974) conducted a study quite similar to this one and had this to say about pupil vs. teacher beliefs:

> Comparing the teacher's accounts of the lesson . . . with those of the children produced different accounts of the "same" scene. It was sometimes difficult to recognize that the children and the teacher witnessed the same event.

> The children's responses during the lesson provided different conceptions of correct and uncorrect answers which contrasted with the teacher's expectations . . . the children seemed to receive and organize the lesson in terms of their own orientations at the time of the event. (p. 4)

Researchers attend to pupils as learners, teachers attend to outstanding (in a positive or negative sense) pupils, and parents attend to their own children. This study will focus attention on the intermediate grade pupils as a coherent social group.

A second and related intention is to provide a holistic account of the school life of fourth and fifth graders. Again, the perspectives of other groups are constrained in various ways. LRDC staff are mainly interested in those aspects of school life that pertain to their particular endeavors. There are mathematics experts, science experts, computer-assisted instruction experts, and so on. The mathematics expert knows little about what pupils do in art class. Similarly, teachers are most knowledgeable about those aspects of school life where pupils are under their direct charge. The homeroom teacher rarely visits the science lab or talks with the science teacher about what goes on there. By describing all of the settings that make up school life, opportunities for cross-subject or cross-setting comparisons are possible. I will make some of these comparisons, but it is hoped that others will make many more and more meaningful comparisons between the particular settings in which they are the principal actors and other settings where they don't play a role.

Procedure

This project can be best characterized as occurring in three phases. During the first phase, which lasted approximately four months, data collection was unobstrusive, undirected, and unstructured. It consisted of observing children, taking notes on their school life and, somewhat later, recording their spontaneous conversations. During the second phase, which lasted approximately two months, data gathering intruded into school life and became more structured and systematic. During this phase, three types of open-ended but directed interviewing techniques were used with a few children. During the last phase, also lasting two months, data gathering became highly structured and systematic. A similarities judgment instrument was administered to all fourth and fifth graders, and they were all repeatedly observed using a behavior observation scale. Each phase of the research built on the previous phase in that the results from each phase were used in constructing the data-collection procedures in subsequent phases. Because of this last feature, it will be necessary to present some of the results in the procedure section in order to show how techniques were constructed.

Phase 1: Observation and Recording

The first step in any piece of fieldwork is the establishment of one's role vis-a-vis the culture one studies. I could not operate from a blind (although such methods may be possible

in future investigations of schools), nor could I pass as a fourth grader. I presented myself to the population at Longbranch as a researcher from the Learning Research and Development Center. This role was easily taken on because researchers are a common feature in ITS and most experimental schools. Beyond this initial starting point, the role became more difficult to fulfill because, unlike previous researchers at Longbranch, I did not have a short-term well-specified set of objectives. Well into the project, I was still being asked by pupils or teachers what I was doing there. My answer was usually framed as "I'm trying to see what kids do at Longbranch." Seeing me taking notes in a notebook, pupils asked if I was writing a book about them. When I replied that I was, they asked, "Will I be in the book?" I always replied in the affirmative. For the pupils, then, I became the "man who is writing a book about Longbranch." I observed fourth and fifth graders in every setting in the school where they might regularly be found for three days a week over a four-month period (November through February). The most frequented areas included: a homeroom classroom; a learning center shared by several homerooms which contains computer terminals, bookshelves, racks holding consumable lesson sheets, and aide stations; hallways; the library; the playground; the gymnasium; and a science lab. An implicit assumption from the beginning was that the school as an environment was "differentiated" and that rooms or areas of the school might be an important source of variation in the environment. This assumption was to prove correct.

I literally followed classes (two each in the fourth and fifth grades) around in the school. When a class had finished art, I followed it to the library; when it had finished (after 50 minutes) in the library, I followed it back to the homeroom, and so on. I took notes on features of rooms or areas, on pupils, and on activities or recurrent themes of pupil-room-behavior interaction patterns.

This observation period aided in the construction of my own cognitive map of the school. This map was not a blank space to begin with in that I had had some prior exposure to elementary schools as a former pupil and had considerable information about the curriculum and management system that had been designed at LRDC and implemented at Longbranch. Hence, my cognitive map of Longbranch was refined and filled in during this period. This personal cognitive map was used throughout the remainder of the data collection and analysis period as a kind of standard against which I could compare the cognitive maps of children.

A second aim of the observation period was to allow the population of Longbranch to fit me into its cognitive map. I knew that my method would eventually call for interviewing pupils and, perhaps, teachers. I wanted my respondents to feel unthreatened and uninhibited in my presence. Therefore, as a researcher, I neither aggressively pursued my prey nor remained distant and aloof. In the course of taking notes, I answered pupils' and teachers' questions about myself and my work honestly,

and I helped out whenever asked. By the end of December, I knew the names of all 80 fourth and fifth graders, and they knew my name. (Unhappy with my request to be called "David," they called me "Mr. David".)

The first step in eliciting pupils' views of their school was through the use of a tape recorder to record the conversations of small groups of pupils. After approximately a month of observing, I knew where pupils gathered to chat and I was sufficiently welcomed in the community so that my further intrusion via a tape recorder was permitted. One such spot was a file cabinet filled with tape cassettes (used in spelling) located in the hallway. When two or more pupils arrived at the cabinet at the same time to get or return a cassette, a conversation usually ensued. A tape recorder was left to run on top of this cabinet for two hours of tape time. These recorded conversations were gathered from several spots in the school, and six hours of such conversation was recorded and later transcribed.

From a technical standpoint, the tapes proved to be very bad; they were inaudible, garbled, or just plain blank. From the salvageable portions, two findings emerged. As I expected, pupils used language rather differently from me. They used terms and constructions which, had I not known the context, I would have found meaningless. I would use these terms later in my interviews with children, and knowing at least something of their language greatly facilitated my work. These conversations overwhelmingly dealt with two topics: 50% of the time (on Mondays this jumped to 75%) pupils discussed television programs

they had recently seen, and 40% of the time they talked about "activities." The term *activities*, I later learned, has at least two meanings: It can refer to the period after one's work is done when one can freely choose to engage in an "activity" (playing a game, drawing, reading, etc.), or it can be used as a general term that includes all the patterned behaviors that pupils (but not teachers) engage in (such as working, making, playing, etc.) in school. In conversation, words like *playing*, *making*, *working*, and so on occurred frequently and seemed to be used as opening and closing gambits, such as "What are you working on?" or "Let's make monsters with the Tinkertoys" or "I think I'll do my work now."

Phase 2: Eliciting the Pupils' Cognitive Map

I will discuss further ramifications of these tapes in the results section, but at the time, I used them as a guide in setting up the next phase of research. I had already been struck in my observations by the range of activities that pupils engaged in, the extent to which they themselves determined the onset and termination of an activity, and the co-occurrence in the same room of several seemingly disparate activities. It seemed reasonable to assume that a cognitive map of school life might be organized around these named activities. But the cognitive map could not be gleaned from the conversations nor inferred from an outsider's observation of pupils' behavior.

Getting at this cognitive map would prove difficult. Ethnoscientists, notably Frake (1964), have had considerable success

in eliciting cognitive maps of medicine, law, ceremonial events, and so on, but their informants have always been adults and they have always worked within clearly bounded domains. They have sought the conceptual schema that native peoples use in coding and organizing concrete objects such as plants, trees, kinsmen, and so on, but they have not dealt with anything as abstract as activities. Furthermore, they have not sought to demonstrate that the cognitive maps they elicit from one or two informants are representative for any and all similar informants.

Piaget, in the introduction to *The Child's Conception of [illegible]* (1960), outlines a very nice belief elicitation procedure which he calls the *clinical examination*. Unfortunately, he carried his examinations only far enough to tease out key differences in the thought processes of children of different ages, without being able to show any kind of complete map for a given domain (Lancy & Resnick, Note 1).

So, I used several different interviewing techniques borrowed or amalgamated from the techniques of Piaget, the ethnoscientists, and Jerome Bruner. An exerpt from the first technique used is shown here:

D.L.: What else do you do in library?

John: We throw things.

D.L.: What kinds of things do you throw?

John: Oh, spit balls, pencils, paper airplanes.

D.L.: What kind of activity is it when you throw things?

John: That's when we're fooling around.

D.L.: How else do kids fool around in the library?

John: They bug people.

D.L.: What does that mean?

John: Well, when someone is working, you bother them. You steal their pencil, or call them names. Anything to get 'em upset.

The technique is similar to a clinical examination and involves querying kids about their activities, trying to get at definitions and relationships. Minimal content analysis of this exerpt reveals, for example, that "throwing things"[1] is coded by pupils as "fooling around" and that one can throw a variety of things, including "spit balls," "pencils," and "paper airplanes." "Bugging" is a second class of activities under fooling around, and John (a fifth grader) defines this activity here. I conducted several of these interviews with fourth and fifth graders of both sexes, each lasting roughly 20 minutes, and the terms and relationships that John mentioned appeared in other interviews.

The interviews proceeded from the assumption that the cognitive map is constructed as a taxonomy of terms related to each other semantically. There would be superordinate and subordinate terms and minimal taxa (terms with no subordinates). My questioning strategy was to start a pupil off in a branch of the

[1] Henceforth, whenever I first use a term or phrase which was elicited or overheard from a pupil, it will be placed in quotation marks.

taxonomy and then lead him or her up and down the branch. In the interview with John, we moved down from throwing things to (subordinate) throwing spit balls, then up to (superordinate) fooling around and down again (subordinate) to bugging someone. In this way, the taxonomy is gradually filled in. To be sure, I was alive to the possibility that these terms did not fit together taxonomically at all. But, since pupils responded quite readily to my very general prompts with similar patterns of responses, I was led to believe that a semantic taxonomy was indeed the correct way of representing this particular cognitive map.

In addition to questions relevant to the creation of a taxonomy, some questions were directed at defining certain terms such as "bugging someone" whose meanings were not obvious. The same terms were defined by different pupils in order to arrive at consensual definitions. Finally, I led pupils to discuss attributes of these terms. Most of these questions followed from the definition-seeking questions. Two attributes of fooling around, for example, are that it is "not allowed" and it is something that you therefore hope to "get away with."

I then interviewed small groups of pupils in the same manner. In these interviews, it became clearer where points of conflict or divergence between pupils could arise. In such a group interview I learned, for example, that pupils play in gym but that some pupils felt cheated by the new teacher because she made them learn skills (as in the various positions in basketball) and tested them on their knowledge of these skills.

Others said they simply ignored this intrusion of work into a play area and continued to believe that the gym was for "playing." I was also impressed, however, with the extent to which pupils agreed on definitions and relationships within the domain of activities. A cognitive map of activities seemed to be emerging from these interviews. There were a finite number of named activities, and these were related to each other in a hierarchical fashion.

One further technique I employed was borrowed from Bruner (Bruner, Olver, & Greenfield, 1966), the 20 questions game. I constructed a list of 25 sentences. Each sentence contained an activity, a named fourth or fifth grader, and a location (e.g., "Don is looking up something in the encyclopedia in the library"). Fifteen pupils were individually given some instruction on how to play the game. Here is an example of such an interview conducted in the game format:

Maureen: Is it a boy?

D.L.: Yes.

Maureen: Is he tall?

D.L.: Yes.

Maureen: Does he have dark hair?

D.L.: Yes.

Maureen: Does he have glasses?

D.L.: No.

Maureen: Is it Tommy?

D.L.: No.

Maureen: Is it Jimmy?

D.L.: No.

Maureen: Don?

D.L.: Yes.

Maureen: Is he working?

D.L.: Yes.

Maureen: Is he doing his math?

D.L.: No.

Maureen: Reading?

D.L.: No.

Maureen: Maintenance?

D.L.: No.

Maureen: Spelling?

D.L.: No.

Maureen: Is he in our room?

D.L.: No.

Maureen: Is he in the library?

D.L.: Yes.

Maureen: Is he doing his library skills?

D.L.: Yes.

Maureen: Is he taking a test?

D.L.: No.

Maureen: Work pages?

D.L.: Yes. What's he doing his work page on?

Maureen: Does he have to use the card catalog?

D.L.: No.

Maureen: Pencil?

D.L.: No.

Maureen: A tape?

D.L.: No.

Maureen: A book?

D.L.: Yes.

Maureen: Dictionary?

D.L.: No.

Maureen: Encyclopedia?

D.L.: Yes, Don is looking up something in the encyclopedia.

The object is to have the child use his or her cognitive map of the school to partition the set of possible alternatives in order to arrive more quickly at the solution. When Maureen asks, "Is it a boy?" and I answer "Yes," she eliminates half the alternative pupils. When she asks "Is he working?" and I answer "Yes," she eliminates all activities coded as fooling around, making, helping, or playing. Further down, one can see how she partitions the various subjects children work on: math, reading, maintenance, spelling, and library skills. Unfortunately, as promising as this technique appeared, I ran into an anticipated cognitive development problem. In Bruner's research, young children do not use a partitioning strategy in the 20 questions game; they ask questions that eliminate only one alternative. Older children do use the strategy, but fifth and sixth grade appears to be the threshold age for this behavior. Thus, although some

of my informants were able to use the strategy, others were not--Maureen was a good strategist.

Thirty pupils were interviewed using the three types of interviews mentioned above. These were recorded, transcribed, and analyzed for content. A taxonomy of activities emerged from these efforts (Figure 3), which will be discussed in the results section. In addition to activities, I directed pupils to the domains of places and people in the school. These questions proved less fruitful as lines of inquiry, and this will also be taken up later.

Phase 3: The Use of Instruments

Several questions remained open despite the confidence I placed in the accuracy of the activities taxonomy. These were generated by concern for the validity of the taxonomy as a widely shared belief system and a desire to discover if there were any systematic departures from the normative portrait I had achieved this far. The interviews on which it was based were collected from a nonrandom sample of the fourth and fifth graders; each interview overlapped previous interviews, but they were in no sense controlled or standardized. Thus, one might ask whether any feature of the taxonomy holds for all pupils. Of particular concern was the structure of the taxonomy: Were the hierarchical relationships depicted therein an accurate reflection of some cognitive map which children held of schools? A final, important question deals with the underlying dimensions

of the taxonomy--the qualities or attributes that suggest why activities are grouped as they are in the taxonomy.

To answer these and other questions and, in general, to validate the taxonomy, I designed a *similarities judgment* instrument, a page from which is shown in Figure 1. I wanted a device that would tap the relationships among activities but which could be standardized and economically administered to all 80 fourth and fifth graders. I composed 25 phrases, each of which had been a part of a pupil's response in a clinical examination interview, but selected so that the main (taxonomic) categories would be about equally represented. As can be seen in Figure 1, each phrase included an activity and a setting. Each of the 25 phrases was paired with every other phrase, and pupils were given a five-point similarity scale and told to rate the degree of similarity of each pair. This yielded a total of 300 judgments made by each pupil. Pupils were administered the test in groups of five, all seated around a table. There were several sample judgments which they made before beginning, and a set of instructions. The test was broken into three parts, and pupils completed one part a week for three weeks. Average time to completion was 12 minutes per part, and this did not vary over test dates. Pupils understood the requirements and completed the test willingly. A problem did arise, however. There was a strong tendency to rate all pairs as "a lot different." After the first test session, I exhorted pupils, prior to beginning the subsequent parts of the test, to "think of ways the two things are alike."

Playing dodgeball in gym / Playing with Rosie in science	different	a lot	a little	both	a little	a lot	alike
Doing a Min Ex in science / Flying paper airplanes in the room	different	a lot	a little	both	a little	a lot	alike
Giving your folder to the aide / Flying paper airplanes in the room	alike	a lot	a little	both	a little	a lot	different
Cleaning the boards in the room / Learning a basketball skill in gym	different	a lot	a little	both	a little	a lot	alike
Getting a tape in the hall / Getting a prescription from the teacher	different	a lot	a little	both	a little	a lot	alike
Playing a game in the corner / Getting a tape in the hall	different	a lot	a little	both	a little	a lot	alike
Doing selected reading / Listening to the teacher in health	alike	a lot	a little	both	a little	a lot	different
Doing a Min-Ex in science / Listening to the teacher in health	alike	a lot	a little	both	a little	a lot	different
Taking a CET in reading / Building a puzzle in class	different	a lot	a little	both	a little	a lot	alike
Listening to the teacher in health / Doing seatwork	alike	a lot	a little	both	a little	a lot	different

Figure 1. A page from the similarities judgment instrument.

A variety of questions can be put to the similarities data, but three were of critical importance. Using a hierarchical clustering procedure devised by Johnson (1967), it is possible to test the extent to which the phrases form clusters. Clusters are formed when a large proportion of the subjects rate phrases as being similar. Since the output from the Johnson program shows clusters arranged in a tree structure, this can be compared directly to the taxonomy elicited through interviews and can act as a check on the structure of the taxonomy.

A second question concerned the identification of the dimensions or attributes underlying the taxonomy. The KYST program (Kruskal, Loring, & Seery, no date) was applied to the data to find the number of dimensions that best accounted for the variance in subjects' judgments. Once this number is found, a weight on each dimension is computed for each of the 25 phrases. The weight value signifies "how much" of the particular attribute is contained in the phrase.

Finally, because clustering was not perfect, another technique was used to determine whether the map was roughly the same for all pupils or whether there were subgroupings of individuals, each using different attributes to order the activities domain. The results of the clustering program indicated that pupils did not wholly agree on the extent of similarity of the different phrases. The possibility existed that not all of the attributes were being used by all pupils in making their judgments. A program called INDSCAL (Carroll & Chang, 1970) was used to test for

this possibility. INDSCAL treats the data from each subject separately and assigns a dimension weight to each. If we were to find, for example, that one group of pupils had high weight values while another group had low weight values for the same dimension, then we would have to allow for the possibility of two or more cognitive maps. On the other hand, if there were very little variation in dimension weight values over subjects, we would come to conclude that all pupils view activities in much the same way and that they share a single cognitive map of them.

From a purely pragmatic standpoint, the belief system of pupils is of little worth if there is no relationship between the way they perceive the school and their behavior patterns in school. The empirical relationship between belief systems and overt behaviors has been a matter for lively research and debate (Bem, 1970; Fishbein, 1967) which will not be resolved in this study. My observations had confirmed that the activities included in the taxonomy were indeed taking place in the school setting but I did not have a firm sense of their frequency relative to each other. I did not know, for example, whether children spend more time engaged in making activities or more time in playing. I also had reason to believe that frequency would vary as a function of the particular setting, so that fooling around, for example, might be more prevalent in the library than in the science lab. Finally, it was clear that individual children varied greatly in their involvement in these activities.

I constructed a behavioral observation scale to answer these and other questions. The categories and definitions were taken from the 25 interviews I had done. The scale is shown in Figure 2, and the codes can be found in Appendix A. Since the taxonomy contains over 25 categories, I had to be somewhat selective. Thus, several types of fooling around were coded together as other,[6] all types of play as playing, all making activities as making, and so on. Pilot use of the code made it clear that a few categories not found in the taxonomy would have to be added. Pupils did not distinguish between talking to the teacher and listening to the teacher. Since I wanted to retain this distinction, I created two categories: watching and listening and talking to. These two categories were split again, and each was coded as either I or O, depending on whether the pupils were watching something related to instruction (I) or something else (O, other), and whether the pupil is talking to the teacher about instructional matters (I) or something else (O). Talking with peer, which pupils called "visiting," is found in the taxonomy under fooling around, but pupils do talk to each other about instructional matters as well, so I included the I/O distinction there also. Finally, although the category unidentified was

[6] In the original version of the instrument, the term *fooling around* was included to describe a category of behavior. The school principal, cognizant of the school's critics, objected to the use of this term, so I changed it to *other*. During the observation research, however, the category was treated as fooling around.

Date _____ Time _____ Teacher _____ Homeroom Place _____

Variables	Time Intervals 1	2	3	4	5
Pupil's Name					
Location					
Group					
Working					
Getting					
Watching/listening to (I O)					
Daydreaming					
Talking with aide with teacher (I O)					
Talking with peer (I O)					
Helping teacher					
Helping friend					
Playing					
Making					
Other [a]					
Unidentified [b]					

Location Code
- A At seat
- B Traveling
- C On the floor at play table
- D At teacher's desk
- E Tape table
- F Periphery
- G Out of the room

Place Code
- 1 = Block
- 2 = Other Studies
- 3 = Art
- 4 = Library
- 5 = IS
- 6 = Sci SS

[a] Reading aloud
[b] Waiting

Figure 2 Pupil behavior observation schedule

originally intended as a garbage category, throughout the first quarter of the observation research the only uncodable behavior was waiting; so I defined and observed unidentified as waiting for the rest of the research. These categories were then exhaustive of all pupil behaviors.

In addition to activity, two further kinds of information were collected because they seemed to have an impact on activities. These were whether the pupil was engaged in an activity with one or more other children--the group category--and the pupil's location in the room.

Each column in Figure 2 represented one observation trial for one pupil. Trials lasted 15 seconds. The first 10 seconds (timed on a stopwatch) were used to locate the child whose name appeared on the top of the column (these names were listed alphabetically). The observer moved close enough to the child so that a precise determination of activity could be made. The child was then observed for 2-3 seconds, and the observer coded all of the relevant information. Pupils were observed in rotation through an entire class, and observation trials on single pupils were spaced at least 10 minutes apart.

Each of the 80 pupils was observed[7] in six different settings in the school, and the number of trials/pupil/setting

[7]It should be pointed out that I was the observer in all but one of the settings where I was joined by a co-observer. At the time of this particular study, I had logged many hours in various settings in the school. Teachers and pupils were, therefore, thoroughly acclimated to my presence and to my moving around the room and staring over pupils' shoulders.

varied to take account of the fact that pupils spend proportionally more time in some settings than in others. The settings and the number of times a child was observed in each setting were as follows:

1. Block--a 3-hour period in the morning when children work in individualized math, reading, and spelling curricula: 10 obs.

2. Other Studies--a 1-hour period each afternoon when children have traditional, nonindividualized studies in various subject-matter areas, including health, social studies, and language arts: 6 obs.

3. Art--two 45-minute periods per week when pupils have art with a special teacher: 5 obs.

4. Library--an individualized course (LS & RS) in library skills which pupils have in the library under the direction of the school librarian. There are two 45-minute periods during the week that a class spends in the library: 5 obs.

5. IS--refers to individualized science, a class that pupils have once a week for 45 minutes in the science lab with the science teacher: 5 obs.

6. Sci-SS--refers to self-selected science. Pupils are required to visit the science lab on their own initiative at least 45 minutes a week during which time they are expected to work on lessons, and if they spend more time in the lab, they may elect to do other self-selected projects. Most spend more than 45 minutes per week in the lab, and most engage in self-selected projects: 5 obs.

Thus, a total of 36 observations were made per pupil, and the number of observations per setting was 800 in Block, 480 in Other Studies, and 400 in the remaining settings. Although I was the principal coder for the study, I was joined by an experienced coder in the Art setting. We independently coded for group, location, and activity for five trials. Average inter-coder agreement was satisfactory at 78.8%. Disagreement arose almost exclusively because we occasionally fell "out-of-sync": The activities of pupils change so rapidly that two observers must be coding at the same second to achieve total agreement. All of the behavior data was then computer analyzed for frequency counts, and categories were cross-tabulated.

The behavioral observation study was the last piece of research that I carried out at Longbranch. It came very near the end of the year, but it represented what I consider to be the last link in a methodological chain. This chain stretched from the casual observation of pupils' behaviors based on an outsider's cognitive map of the school, to rigorous behavior observation and scaling based on the pupils' cognitive map of the school.

Results

I will not attempt, in this section, to review all that I learned about the beliefs and behaviors of pupils at Longbranch. Most of these findings will be presented in subsequent papers which will focus, respectively, on individualized versus non-individualized classes, the science lab, and pupils as individuals. Rather, the results section will set a background for

the more focused reports to follow, and then summary results from the various techniques employed will be used to dissect the assumptions, theoretical foundations, and methodology of this project.

The School Setting

School life for pupils in the intermediate grades at Longbranch consists, in many respects, of experience no different from the experiences that other children have who are not in experimental schools. Pupils do not choose to attend Longbranch; they are required to do so by virtue of the compulsory education law and their place of residence. Most walk or are driven to and from school by their parents, and the school day runs from 9:00 a.m. to 4:00 p.m. The school building is square in shape with offices, special purpose rooms, and a gym in the middle; classrooms and a learning center for the primary grades occupy one side of the square, while those for intermediate grades occupy the opposite side. The building is one story, modern, very light, and clean. The two learning centers at opposite ends of the building and the H-shaped hallway that connects all the rooms of the school are the focal points for pupil-pupil interaction.

There are homerooms and homeroom teachers; "special" teachers for art, music, science (the only male teacher in the school), and gym; a nurse; and a nonteaching principal. The principal is benevolent but stern, and misbehaving pupils are sent to her office to cool their heels before being given a bracing admonition.

Pupils travel en bloc to the gym several times a week, twice a week to the library, and once a week to the science lab. At other times, they travel singly or in small groups to small group classes (to learn to play a musical instrument, to receive special tutoring under Title I), to the science lab, the library, the office, or to various locations in the school where supplies or learning resources are stored. These trips can be occasions for a little fooling around, that is, talking or running.

While pupils do have assigned seats, desks are movable, and arrangements of them are highly varied across homerooms and over time. Pupils can maintain direct eye contact with at least two other pupils in every room except the library (where vision is blocked by high partitions on three sides of each desk). The seating arrangements allow a high degree of propinquity. One wall of each room is dominated by windows under which there are shelves. The remaining walls are given over to blackboards and bulletin boards, and there will be a long seat-bench where the tape players are situated. In a sense, there is no front of the room, except the spot where the teacher's desk is situated, and this changes as well. Large areas of the floor are left open, and pupils are permitted to sit and lie on the floor to do their work or play games. In two rooms, carpets are provided to facilitate this.

The learning center is fed into by four classrooms. In the one used by fourth and fifth graders there is a large table on which there are six cathode-ray tube (CRT) computer terminals, four desks at which aides are stationed, shelves with books, and

racks with consumable lesson sheets. The main hallway contains a drinking fountain and a filing cabinet for cassette tapes, and the halls are used as a gallery for the display of student art work. The science lab is in a separate building to the rear of the school. There, large tables and booths are used in place of desks, stands holding equipment run along two walls, and there are animals in glass aquariums in one corner of the room. In short, the physical settings are diversified, modern, and flexible. One gets the impression that the school is there for the use of pupils in the sense that only three spaces in the school are off limits to pupils. These are the boiler room, the teachers' lounge, and the office. Otherwise, pupils may take a great deal of initiative in using and arranging the objects and spaces in the school.

The school day is divided into two parts. From 9:00 to 12:00, children are in Block. Block is characterized by a self-management scheme (Stone & Vaughn, in press; Wang, 1974) whereby pupils work on prescribed assignments and engage in self-selected activities according to plans which they have constructed in conference with their teacher. These daily plans list the "goals" that the child has agreed he/she will accomplish that day. Such goals might include: "doing" a number of reading "pages," "doing" a "skill" in a math "unit," taking a "CET" (curriculum-embedded test), spending time on "SPELPAT" (a computer program that teaches spelling), spending some time in the science lab, and spending 45 minutes on "selected reading" (pupils select books from an approved list). Each day must include some goals (and

therefore some work) in math, reading, and spelling; other areas are optional. The child also specifies the amount of time during Block that he expects to spend playing. However, the system works in such a way that if today's or this week's goals are not met, then the child is usually not permitted a self-selected activity (playing or making) the following day/week. Children may do their tasks in any order they choose. Most claim to start with the hardest work first; go on through to the easiest; and when their work is finished, engage in a self-selected activity. There are formal and informal sanctions against playing before one's work is finished, although, technically, the child may play whenever and as much as he/she wants as long as the goals are met.

All of the subjects which children encounter in Block are "individualized." That is, these curricula have been designed to allow a child to progress at his own pace. Typically, a child works on lesson sheets until he reaches a test point. He gets the appropriate test, takes it, and then has it corrected by an aide or corrects it himself using a key. The child reports the results of his test to the teacher who then gives the child a prescription either to go on to a higher level or to stay at the same level for additional practice. The only exception to this general rule is "seatwork." At the beginning of Block, teachers pass out or put on the board a series of questions or math problems. This seatwork assignment must be done by all the pupils on the day it is assigned. Seatwork takes from 10 to 30 minutes to complete. In practice, then, the child is rarely

engaged in any type of task for very long. Children shift from lessons to tests, from subject to subject, from mode to mode (i.e., lesson sheets, computer terminals, cassette tapes), and around and out of the classroom.

In contrast, subject areas in the afternoon period are not always individualized. Furthermore, the class is much more under the direct control of the teacher. During art, social studies, gym, library skills, and so on, all children work in the same subject area at the same time. These classes begin and end at set times; most last 45 minutes. Social studies most closely resembles a traditional curriculum. There are textbooks, mimeographed sheets with sentence completions, and teacher-directed oral questioning of the entire class ("Who remembers when Jamestown was founded?"). Pupils usually remain in their seats during the entire social studies class and do not leave the room. Other subjects tend to be more like Block and less like social studies on a kind of pupil-managed to teacher-managed continuum.

The foregoing description could continue almost indefinitely, but the purpose of this research was not to show an outsider's cognitive map of the school, but rather to show the cognitive map that fourth and fifth graders have of Longbranch. This cognitive map is a reflection, of course, of the great diversity of experiences which this school provides. To briefly review the major sources of this diversity:

1. Spaces. There are a variety of different kinds of spaces within the school and within each classroom. Further-

more, objects within the rooms such as desks, tables, shelves, carts, and so on, are frequently moved around yielding variation over time in the physical environment.

2. Subject areas. Longbranch, like most elementary schools exposes children to a variety of subject areas. These include math, spelling, science, reading, library skills, social studies, art, music, health, and gym. Unlike most schools, however, subjects are further varied by the fact that some are individualized to the child's abilities and interests. The individualized curricula are the first five mentioned above. During Block, the order in which a child works on subjects is a matter of individual choice and is, therefore, quite variable.

3. Objects. There is a remarkable assortment of things (or, in pupils' language, "stuff") to interact with in Longbranch. Each child, for example, has his own set of cardboard folders, one for each of several subject areas, and the contents of these folders alone is worth mentioning. They contain planning sheets with goals set and accomplished in individual subjects, a planning sheet for all subjects for the week, workbooks, lesson sheets, corrected tests, seatwork dittos, paperback books, *Weekly Readers*, pictures the children have drawn, maps, and so on. Folders are not kept in children's desks because these are already filled with textbooks, tablets, pencils, and so forth.

Children utilize a variety of electronic devices in their work, including CRT terminals, teletype terminals for testing, tape recorders and players, filmstrip projectors, machines that teach word recognition, reading machines that combine still

pictures and records, and pocket calculators. In the science lab, children use balances, microscopes, graduated cylinders, motors, dissecting tools, and a large assortment of chemicals and common household products.

In nonwork pursuits, children can take advantage of a well stocked supply of games, sports equipment, and art materials.

4. Management. As indicated above, children largely control access to and the use of school resources; however, a brief vignette will illustrate the range of management possibilities. Children are taken to the gym twice a week by their homeroom teacher. The trip to and from the gym is marked by almost military regimen: Pupils march by twos in a column and are not permitted to talk to one another. Once inside the gym, however, they may choose the "game" they will play. A frequent choice is "murder ball," which is less a game than "chaos with two sides."

Curricula vary in the extent to which decisions are made by the pupil or the teacher, and teachers vary in strictness. Some run a tight ship; their classes are quiet with a minimum of unnecessary movement by pupils. Others permit, or are unable to prevent, pupils pursuing their inclinations to fool around.

5. Grouping. Teachers grant pupils considerable leeway in terms of whether they may pursue activities singly or in groups. The science curricula, for example, frankly encourages pupils to complete many projects in groups of two or more. In social studies, ditto sheets are filled in by groups of 4-5 pupils working together. Pupils may help one another in math, and playing

and making activities frequently involve groups of two or more pupils.

With a few exceptions which will come out later, pupils take full advantage of these diversified experiences. In a sense, what I have described are the features contributed to the school by tradition, by teachers, and by curriculum developers. Pupils sometimes take these features as given and make the most of them, sometimes they actively alter existing features, and sometimes they add features not present in the design.

Pupils' Beliefs

Neither participant observation nor the tape-recorded conversations permitted any analysis of children's beliefs about school life. Activities were a frequent topic of children's conversations, but the amount of unsolicited verbal data was too little to perform content analysis for semantic structure. These tape recordings were, if anything, more interesting for what they did not contain. For example, children rarely talked about other pupils or teachers. They did not, in other words, gossip. Nor did they talk much about their school work, unless engaged in work with another pupil at the moment.

A belief system that centered on activities seemed to emerge from my unstructured observation and recording. Children talked about activities, and I, as a neutral observer, was anxious to probe further the diversified behaviors that I witnessed. Using the elicitation techniques described in the procedures section, I gradually uncovered a cognitive map of activities. This map is shown in Figure 3.

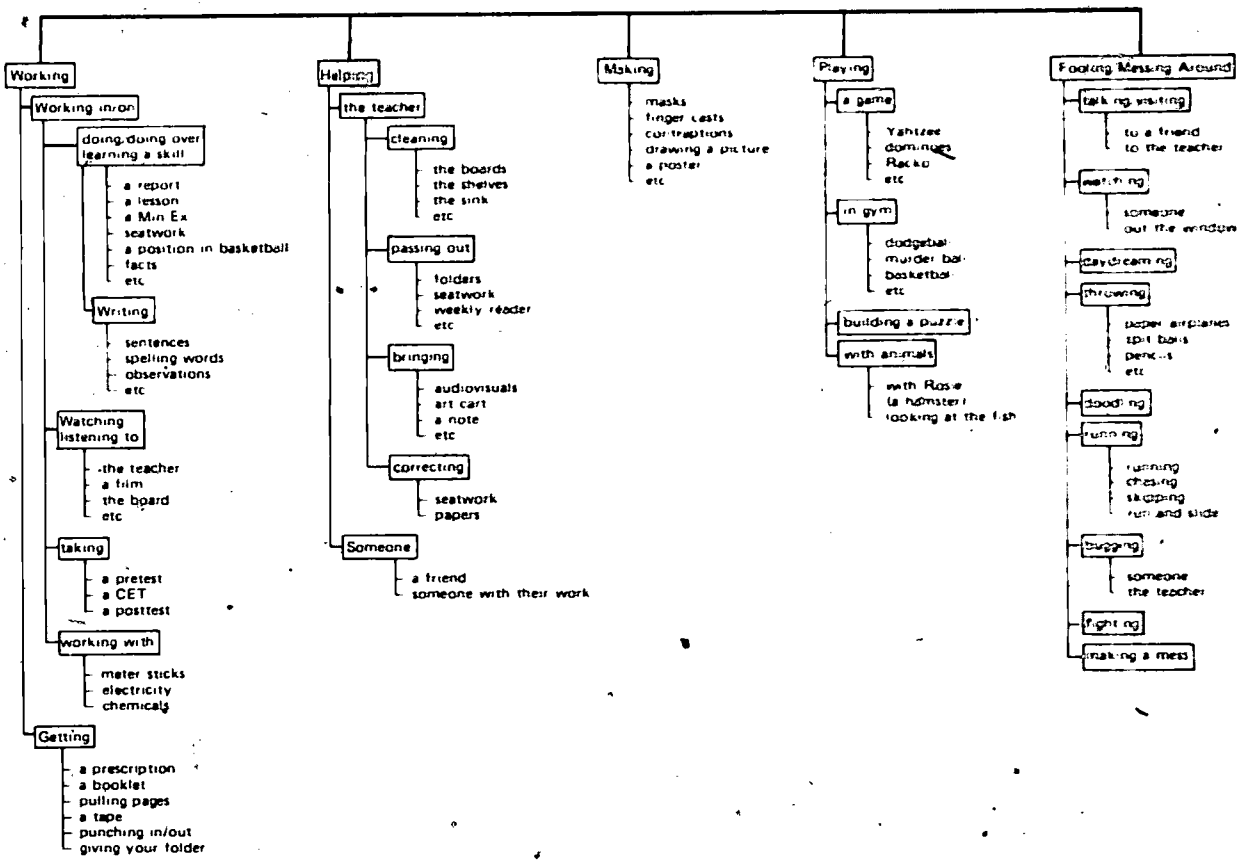


Figure 3 The elicited taxonomy of activities

Working is the principal business of the school from the pupils' (and undoubtedly others') point of view. Even pupils who say they do not like to work agree that working is what school is for. I lack systematic comparative data, of course, but it seems that individualization coupled with the self-management scheme produces a distinctive atmosphere in which pupils take a much more active role in managing their own school life. In a traditional school the term [illegible] might well be replaced by a term like [illegible], where learning is defined as the passive absorption of information. More specifically, the categories of getting and taking have an importance in Longbranch which they might not have elsewhere. Getting can be contrasted with being given: pupils at Longbranch play an active role in acquiring the materials and counsel they need to do their work. Taking refers to taking a test, of which there are several types, notably pretests, posttests, and curriculum-embedded tests (CET).

Not only do pupils in Longbranch take many more tests than one might expect, but they often decide when they are ready to take a particular test. The three types of test vary in systematic ways, and pupils are sensitive to this variation. The pretest is least test-like in the sense that pupils are expected to do poorly on it because it tests for knowledge they have not yet received instruction on. As a result, pupils take a very casual approach to pretests. Posttests are taken quite seriously, and CETs fall in between. As one pupil put it, "Pretests don't matter, but if you fail a posttest, you get yelled at." Failing a posttest means that one does not go on to a higher level in the

curriculum, and one does not get to fill in a square after one's name on the wall chart indicating how many units each pupil has completed.

Another interesting belief not shown in the taxonomy but reflective of this atmosphere I have referred to is the personal quality of most activities. In the tape recordings and interviews pupils persistently used the possessive pronoun when referring to the objects of activities, for example, "I do my seatwork," "She's doing her Min-Ex," "Jimmy has to take his CET," and so on.

The getting category is depicted in the taxonomy as different from working in/on. Although getting things is a necessary adjunct to working, it is qualitatively different. Unlike doing, taking, and so on, pupils are not evaluated on their performance in getting things. The routine is so familiar that pupils rarely make mistakes. Second, while other working activities may be more or less fun, getting provides opportunities for fooling around (as when a child runs in the hallway enroute to getting a tape, or chats with a friend in the learning center) and is, therefore, usually enjoyable. A persistent problem from the teacher's point of view is that when pupils get out of their seats to get something, a quick trip may turn into a veritable odyssey as pupils get side-tracked both literally and figuratively.

The individualization/self-management system was originally designed to facilitate instruction, but the presence of the helping category indicates a kind of generalization effect. Pupils

take on many of the tasks normally performed by a teacher in non-instructional and instructional areas. Pupils are assigned "jobs" for one-month periods, after which jobs are reassigned. "Cleaning," "bringing," and "passing out" are such jobs. Each pupil has his her own job to do and in most cases, these jobs are done routinely without prompting from the teacher. "Correcting" and miscellaneous tasks are more often assigned on the basis of merit. That is, when the job comes up the teacher assigns it to a child who is reliable or who has his her work done for the day.

The teacher's primary function, aside from record-keeping, is to serve the pupil as a tutor. For this reason, pupils most often turn to her when they are in some difficulty rather than to their peers. Nevertheless, pupils who have a facility in a subject sometimes attach themselves to peers lacking such facility and are called upon when necessary.

Making is a fairly straightforward category and the one part of the pupil's cognitive map that most closely resembles my own. Opportunities to create things are frequent for pupils in Longbranch. In addition to art class, children make things in the library, in their homeroom, and in the science lab.

Likewise, playing is a predictable category, although the extent of play is greater than one might find in a more traditional school. Children visit the gym three times a week where they play various games, some of which (i.e., basketball), however, do contain an element of work. They may also play in other places, particularly the homeroom during Block and in the science lab when they are there in small groups. Teachers and children

both see play as the just reward for work well done; however, teachers differ with respect to the latitude that they permit children in play. Two of them place few inhibitions on the children in play; the other two take a narrower view, and as one pupil put it, "And she [the teacher] doesn't like us to play games like that [building domino towers, then knocking them down] where you don't learn anything!" There are educational games in the rooms, and two of the teachers steer children to these and away from the noisier, more active games.

Play with animals is an interesting category. There are animals in the science lab and in one of the classrooms. Of all the animals, children gravitate to the hamsters, but in playing with them, they place them in a human context. They talk to the hamsters, build houses for them, and create little playlets around the hamsters as people. As one child explained, "I don't like the fish [in aquariums] as much because you can't hold 'em and play with 'em."

Finally, an explanatory note on "building puzzles": These are large jigsaw puzzles, and several rooms have tables set aside on which a puzzle is gradually pieced together by pupils who spend 5-10 minutes at a stretch on it. When the puzzle is assembled, it is boxed and the pieces from a new one are poured out on the table and the cycle begins again.

In the category of fooling around we have the pupil's very unique contribution to school life. By this I mean that other activities can be traced back, in most cases, either to an aspect of instructional practice or to the behavior of teachers and

aides. Fooling around activities are uniquely a product of the pupils as a social group. These activities are present despite the fact that, by pupils own admission, they are "not allowed." The system not only does not provide for them but actively tries to prevent them from occurring. Furthermore, consider the fact that of the five main categories in the taxonomy, fooling around is the only one that is little affected by the experimental school. I am quite convinced that although the cognitive map of pupils in a traditional school would be different in many respects from Figure 3, a fooling around category would be present and that most of the subcategories listed here would also occur.

The only subcategory that requires some explanation is "bugging." Bugging can be translated as bothering someone, for example, by teasing, taking things, pinching, name-calling, and so forth. In Longbranch, pupils not only bug each other, but they also bug the teacher; and teachers bug pupils, at least to the extent of teasing them (good-naturedly).

The main categories are interrelated in systematic ways, but all the categories seem to depend on or revolve around work. Work is primary in belief, if not in fact. Other activities are contingent upon work. A pupil explains: ". . . you work, then you take a break for ten minutes and you fool around or build a puzzle." All other activities serve as either a break from work or as a reward for having done one's work. "Jobs" are done after work is completed, and other chores are assigned by the teacher to pupils who have their work done or who have "met their

goals" on that day. Children are permitted to make things in Block or in the science lab only after their work is done. Art and music classes ". . . aren't work, they're fun." At holiday time, such as Christmas and Valentine's Day, the workload lightens for the entire class, and in its place children make cards, gifts, decorate the school, and play. Play also follows work, or, for students who regularly meet their goals, serves as a break between work activities. Children who do not do their work are denied play privileges. Making and playing can fade into fooling around. Children may start out to make something and end up "making a mess," which is fooling around. They may play (a game, for example) before their work is complete, and this is fooling around; or their play may become overly loud or boisterous, and this, too, is fooling around.

Although the paramount theme in this study is that school life is comprised of activities, two other themes suggested themselves in the first phase of the project. These themes were people and places in the school. I pursued both these themes in the same manner that I pursued the activities theme. I asked pupils, for example, "Are there different kinds of people in the school?", and proceeded from there. There were only two features about people which all pupils used as distinguishing characteristics. These were teachers vs. pupils and boys vs. girl pupils. Teachers are not reliably differentiated into subcategories, and although pupils use features like height, hair color, and the wearing of glasses to differentiate among themselves (see interview, p. 18), these features are not used with any

regularity. Hence, any cognitive map of people would be rather sketchy. It is fair to say that individual pupils do not usually generalize about people in school and that even when they do, these generalizations are not widely shared.

Beliefs about places in the school are thoroughly grounded in reality. Pupils believe that the places in school are those defined by actual partitions and locations, and they use terms in common parlance to denote these places (see interview, p. 18). A cognitive map of places would be, very simply, a list of the most frequented rooms in the school and the playground. These findings suggest that, conceptually at least, the domains of people and places are not very important. As we shall see, however, people and places do have an impact on the activities domain.

In my discussion of the activities domain I have tried to do two things. I have placed activity terms into the fuller context of the school setting. In doing this, I have also offered a kind of validation of the taxonomy as a cognitive map of school life. All of the activities which pupils mention in interviews do in fact occur, and the relationships which are depicted make sense to me given what I know about Longbranch and about fourth and fifth graders there. We can turn now to some further research that was designed to extend this validation.

All 80 fourth and fifth graders completed a similarities judgment instrument composed of 25 phrases, each containing a different activity. The phrases are listed in Figure 4, which

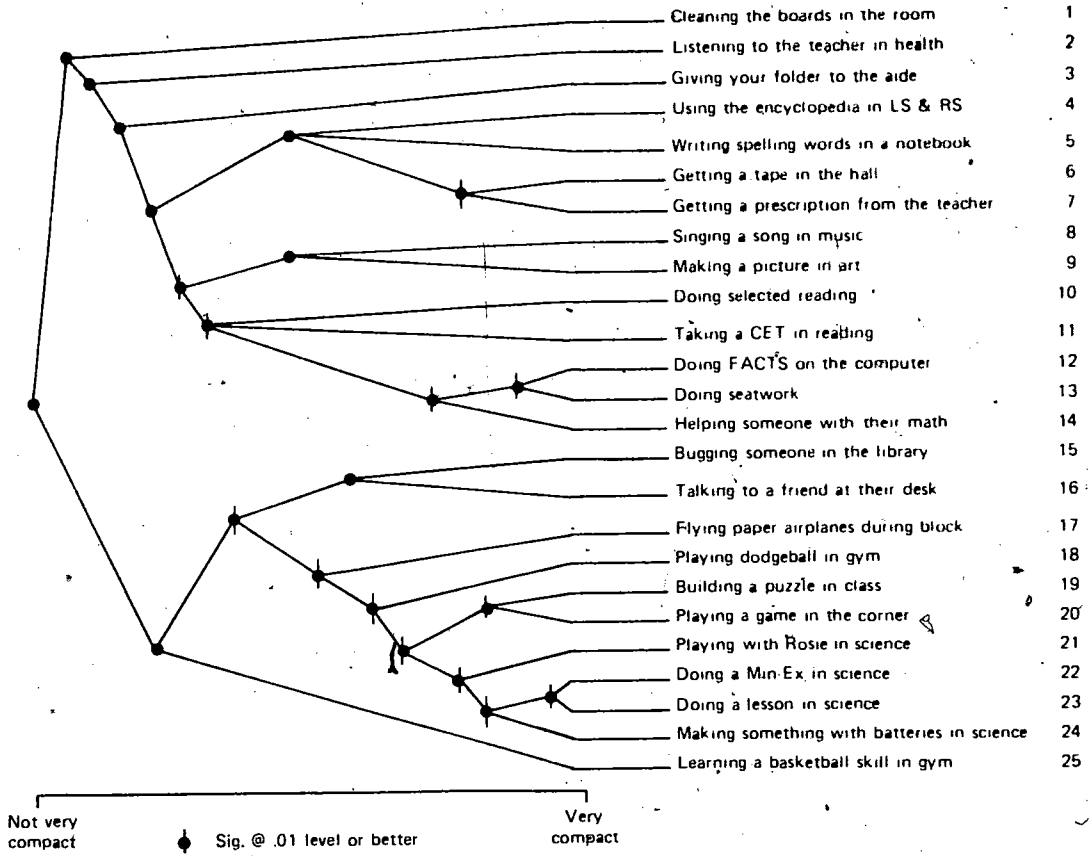


Figure 4. Clustering analysis of similarities judgments: Diameter method.

also shows the results of hierarchical clustering analysis that was performed on pupils' judgments. What these results show are the patterns formed as phrases cluster together. The scale indicates the relative compactness of the clusters. A compact cluster would occur when a large proportion of children believe that two or more phrases are similar. Weak or no clustering would indicate either that there was considerable disagreement among pupils as to the similarity of pairs of phrases, or that two phrases were judged dissimilar by a large proportion of pupils. Johnson (no date) has devised a simple statistic that further clarifies the strength of clustering. This test indicates when a pair or group of items is judged to be similar more often than could be expected by chance at a .99 level of confidence. Keeping in mind that pupils had a tendency to judge all pairs as "a lot different," it is, indeed, encouraging to find that there is a significant amount of clustering in the data. Over half of the clusters are significant at the .01 level or better. This is preliminary evidence that beliefs about activities are not idiosyncratic, but shared.

Comparing Figure 3 to Figure 4, we find considerable overlap between the cognitive map as elicited through interviews and the quasi-taxonomy generated by the clustering analysis. There seem to be two large clusters that correspond to work (top, Figure 4) and play (bottom of Figure 4). There is a very strong playing cluster (phrases 18-21) and a fooling around cluster (phrases 15-17) that merges into the playing cluster. There is a doing cluster (phrases 12-13) and a getting cluster (phrases

6-7). Some phrases would appear to be out of place in Figure 4. Phrases 1 and 14 are not clustered, even though both are helping; this would throw doubt on the validity of the helping category in Figure 3. There is a very strong science cluster (phrases 21-24) which overrides activity-based clustering. That is, phrases 22 and 23 are not clustered with the other doing activities, as one might expect from Figure 3, and phrase 24 is not clustered with phrase 9, even though both are making activities. A similar problem occurs with phrases 10-11, where reading as the subject seems to override taking and doing as the two named activities. One can take the clustering results as partially validating the cognitive map as elicited in interviews, while recognizing that subjects exert an influence on pupil's thinking with respect to activities.

Figure 4 does not show, except in a rough way, the underlying attributes or dimensions that pupils use in making their judgments. This information is provided by the analysis procedures of the KYST program (Kruskal et al., no date). The results of the KYST run on the data are shown in Table 1. The best fit to the data is a three-dimensional solution. The first is a work-play continuum. Phrases with large weight values are work activities, those with low weight values are play or fooling around activities. The second dimension is a noninteraction-interaction continuum. Phrases with low weights involve the pupil in direct interaction with teacher, aide, or peer; those with high weights do not involve direct interaction. The third dimension is an object-words continuum. Phrases

Table 1

Dimension Weights for 25 Phrases in Similarities Judgment Study

Phrases	Weights	Phrases	Weights	Phrases	Weights
	Work		Interaction		Objects
Doing facts on the computer	3 135	Giving your folder to the aide	2 842	Getting a tape in the hall	2 695
Doing seatwork	2 978	Getting a prescription from the teacher	2 610	Playing with Rosie in science	2 509
Taking a CET in reading	2 964	Bugging someone in the library	2 608	Making something with batteries	2 418
Listening to the teacher in health	2 940	Talking to a friend at their desk	2 602	Cleaning the boards in the room	2 399
Getting a prescription from the teacher	2 832	Cleaning the boards in the room	2 516	Flying paper airplanes in the room	2 275
Helping someone with their math	2 821	Getting a tape in the hall	2 404	Making a picture in art	2 258
Writing spelling words in a notebook	2 766	Helping someone with their math	2 387	Helping someone with their math	2 255
Using the encyclopedia in LS & RS	2 679	Flying paper airplanes in the room	2 157	Doing seatwork	2 157
Getting a tape in the hall	2 466	Taking a CET in reading	2 088	Listening to the teacher in health	2 088
Doing a lesson in science	2 444	Building a puzzle in class	2 031	Doing a Min Ex in science	2 073
Giving your folder to the aide	2 337	Playing a game in the corner	1 930	Doing facts on the computer	2 072
Doing selected reading	2 236	Doing selected reading	1 894	Playing a game in the corner	1 903
Doing a Min-Ex in science	2 009	Doing seatwork	1 835	Talking to a friend at their desk	1 707
Making something with batteries	1 881	Doing facts on the computer	1 782	Doing a lesson in science	1 697
Learning a basketball skill in gym	1 866	Playing dodgeball in gym	1 770	Getting a prescription from the teacher	1 616
Clearing the boards in the room	1 706	Writing spelling words in a notebook	1 751	Playing dodgeball in gym	1 612
Talking to a friend at their desk	1 640	Playing with Rosie in science	1 696	Taking a CET in reading	1 514
Playing with Rosie in science	1 519	Making a picture in art	1 468	Building a puzzle in class	1 399
Bugging someone in the library	1 476	Using the encyclopedia in LS & RS	1 461	Learning a basketball skill in gym	1 354
Making a picture in art	1 365	Singing a song in music	1 337	Giving your folder to the aide	1 330
Playing a game in the corner	1 338	Doing a Min Ex in science	1 285	Writing spelling words in a notebook	1 323
Singing a song in music	1 323	Listening to the teacher in health	1 112	Bugging someone in the library	1 186
Building a puzzle in class	1 243	Doing a lesson in science	1 060	Singing a song in music	1 099
Flying paper airplanes in the room	1 036	Making something with batteries	1 009	Doing selected reading	1 051
Playing dodgeball in gym	1 000	Learning a basketball skill in gym	1 000	Using the encyclopedia in LS & RS	1 000
	Play		Noninteraction		Words

with high weights point to the manipulation of objects; those with low weights point to the manipulation or use of words.

The first dimension is consistent with the cognitive map and reflects the fact that, in one pupil's words: "School is half-way supposed to be fun." Furthermore, the work-play dimension accounts for most of the variance in the data; it is the most important attribute. The other dimensions are not obvious from the taxonomy alone, but evidence gathered as a participant observer leads me to comment that most children do value opportunities to interact directly with others in the school and have warm relationships with teachers, aides, and peers. They even talk back (aloud) to the CRT terminal when it responds in type to their input. It is also true that there are many opportunities for pupils to interact with gadgets and other objects in the school, and this attribute is one of the things that makes school life exciting.

The third type of analysis employed in this data was the INDSCAL procedure (Carroll & Chang, 1970). It is designed to show whether all pupils are using the same attributes of the phrases to make judgments on their similarity. There was no evidence from the results to indicate that subgroups of pupils used the attributes differently. For each dimension, and especially for the work-play dimension, weight values varied little over subjects.

To summarize the analyses of the similarities judgment data, it appears that the taxonomy of activities obtained through interviews with a few pupils is an accurate representation of

the cognitive map of all pupils. By and large, the structure of the taxonomy has been validated; although because the phrases contained place and subject information as well as an activity, the clustering taxonomy differs, in some respects, from what was expected. The study revealed that pupils share a common view of school life; there were no sharply idiosyncratic judgments nor evidence for subgroups with differing views. Finally, the study revealed three dimensions which underlie the pupils' cognitive map of activities. These were: work vs. play, interaction vs. noninteraction, and objects vs. words.

Pupils' Behavior

In addition to validating the taxonomy through participant observation and a similarities judgment instrument, behavior observation was used to check on the occurrence of activities and their relative frequencies. The observation schedule is shown in Figure 2 and the definitions of code labels are given in Appendix A. Table 2 presents the absolute frequency of occurrence for the 15 activities that were coded. All of the activities taken from the taxonomy do occur, although some occur relatively rarely.

Table 3 presents the same data collapsed for major categories. That is, activities numbered 1, 2, 3, 6, and 8 from Table 2 are grouped under Working; 10 and 11 under Helping; and 4, 5, 7, 9, and 14 under Fooling Around. Reference to Figure 3 will confirm that these activities have been grouped under the appropriate categories. For example, in Table 3, Fooling Around is composed of: Watching/Listening to (O), Daydreaming, Talking

Table 2
Overall Frequencies of Activities from Behavior Observation Study

	Activity	Absolute Frequency	Percent of Total
1	Working	769	26 6
2	Getting	359	12 4
3	Watching/Listening to (I)	157	5 4
4	Watching/Listening to (O)	289	10 0
5	Daydreaming	122	4 2
6	Talking with aide teacher (I)	118	4 1
7	Talking with aide teacher (O)	32	1.1
8	Talking with peer (I)	96	3 3
9	Talking with peer (O)	307	10 6
10	Helping the teacher	25	9
11	Helping peer	27	9
12	Playing	125	4 3
13	Making	227	7 8
14	Fooling around	113	3 9
15	Waiting	126	4 4

Table 3
Frequencies of Activities Collapsed by
Main Categories Behavior Observation Study

Main Category	Absolute Frequency	Percent of Total
Working	1,499	51 8
Helping	52	1.8
Playing	125	4 3
Making	227	7 8
Fooling around	863	29 8
Waiting	126	4 4

with Teacher (O), Talking with Peer (O), and Fooling Around, and these categories or their equivalents are all listed under Fooling Around in the activities taxonomy. Table 3 shows that, indeed, for the sample of settings taken here, working occupies roughly half of pupils' time, and this is consistent with a widely shared pupil belief.

For the group category in the Behavior Observation Schedule, I found that children spend 11.6% of their time in groups. Their location in the room is shown in Table 4. Pupils spend two-thirds of their time at their seat. But, since seats in Longbranch are not isolated from one another, "being in one's seat" does not imply what it otherwise might. A second point is that pupils use the floor for playing games, reading, and even working on math lessons.

Table 4
Overall Frequencies for Pupils' Location in the Room from Behavior Observation Study

Location in Room	Absolute Frequency	Percent of Total
At seat	1,947	68.0
Traveling	389	13.6
On the floor play table	200	7.0
At teacher's desk	66	2.3
At tape recorder bench	75	2.6
Periphery	186	6.5

The pupil observations were made in six different settings in the school (see page 26 and Figure 2). Table 5 shows some of the setting-activity interactions. For working, for example, it shows how frequently this activity was observed in each of the settings and the proportion of working relative to all other activities observed in that setting. These interactions will be discussed at greater length in papers that focus on the impact of setting on activities. The only point I wish to make here is that although the frequency of a given activity may vary over settings, all activities occur in all settings. Therefore, a belief system that centers on the activity domain is not at all an unreasonable way of conceptualizing school life. Such a belief system does indeed account for, in a descriptive fashion, the behavior patterns of pupils.

Table 5
Frequency and Percent of Activities in Six Different Settings
Behavior Observation Study

Setting	Activities															
	Entering/Leaving		Working		Getting Help		Waiting/Listening (T)		Watching/Listening (O)		Talking with Peer (O) Other		Playing		Making	
	F*	P**	F	P	F	P	F	P	F	P	F	P	F	P	F	P
[illegible]	20	3.5	123	40.4	112	14.0	7	9	59	7.4	90	11.3	49	6.1	26	3.3
[illegible]	14	2.9	97	20.2	32	6.7	117	24.4	31	6.5	23	4.8	5	1.0	13	2.7
[illegible]	[illegible]	2.5	1	1	52	13.0	20	5.0	56	14.0	33	8.3	9	2.3	152	38.0
[illegible]	30	7.5	136	34.0	44	11.0	2	5	38	9.5	62	15.5	14	3.5	4	1.0
[illegible]	25	6.3	116	29.0	52	13.0	8	2.0	52	13.0	52	13.0	33	8.3	2	.5
[illegible]	14	3.5	96	24.0	67	16.8	3	.8	53	13.3	47	11.8	15	3.8	30	7.5
[illegible]	113	4.8	569	12.8	359	15.3	157	6.7	289	12.3	307	13.1	125	5.3	227	9.7

*Frequency
**Percent

Another way of analyzing the observation data is to ask what individual pupils are doing during the observation period. Table 6 presents such an analysis, and further analysis of the behavior of individual pupils will be offered in a forthcoming paper on the subject.

Table 6
Frequency of Pupils on Activities

Activity	Number of Times Observed for 80 Pupils out of 36 Observations Pupil					
	Never	1 - 3	4 - 7	8 - 12	13 - 17	18+
Working[a]	0	0	2	24	42	12
Getting	3	24	47	6	0	0
Helping[b]	38	30	2	0	0	0
Playing	39	40	11	0	0	0
Making	6	51	19	4	0	0
Fooling Around[c]	0	4	18	30	26	2

[a] Working is collapsed from the categories of working watching (I) talking with teacher (I) and talking with peer (I).

[b] Helping is collapsed from the categories of helping teacher and helping peer.

[c] Fooling around is collapsed from the categories of watching (O) talking with teacher (O) talking with peer (O) daydreaming and fooling around.

Table 6 shows that all pupils were observed at least once engaged in working and fooling around. All but three pupils were observed getting something, and all but six making something. Roughly half of the pupils were never observed playing or helping, although this number is probably inflated due to the fact that observations were not made during the last half-

hour of Block, which is when a great deal of playing and helping occur. Pupils spend 5-20% (2-7 obs.) of their time in getting something. Playing and making account for less thean 10% of most pupils' time. Working and fooling around are by far the most frequent activities for pupils. Working absorbs roughly 40% of a pupil's time, although a sizeable minority (12/80) spend more than 50% (18+ obs.) of their time working. Fooling around accounts for 10-50% (4-17 obs.) of a pupil's time, and it is true that pupils who spend more time fooling around spend less time working and vice-versa. Finally, and this finding is not shown in the table, children shift among these activities constantly. It is entirely possible to find a pupil engaged in a sequence of five different activities in five minutes time.

The cognitive map of activities (Figure 3) indicates the range of behaviors that pupils might possibly display in Longbranch. It is an accurate map insofar as all the activities which were named by pupils were in fact observed to occur in this study. The map does not allow one to predict the frequency of any given activity, however, and this observation study provides that information. Based on my interviews, however, I would guess that pupils might be a bit surprised to see how little time they actually devote to playing. Playing seems to loom larger in their talk about school life than it does in their behavior. Table 6 contains several empty cells or cells with small numbers indicating that some pupils rarely or never engage in certain activities. In interviewing pupils and in the similarities judgment study, however, such gaps were not

evident. I am suggesting that pupils share a cognitive map of possible school life activities, even when they do not themselves engage in all these activities.

Summary and Conclusions

In a very real sense, this project represented an attempt to prove the reasonableness, rather than the truth, of some ideas. Let me list these ideas and comment on the extent to which the results were encouraging or discouraging.

1. It is possible to study a school anthropologically. The study reported here parallels in many ways the field studies of anthropologists in more exotic settings. The investigator treated his subjects as informants and sought to learn their language and culture. He remained "in the field" long enough to capture a holistic picture of the society (of pupils).

2. By focusing on beliefs or what people have in their heads, one does obtain a reasonable picture of the culture of interest. I think this is true for this population. It is possible that with much younger children it would not be true. Converging lines of evidence were offered to support the idea that activities are central to the culture of pupils, and the cognitive map that was elicited shows the pattern and stability one expects to find in that culture. There is little evidence that any other conceptual domain can portray the culture as well as activities, and the observation study shows that pupils' behaviors are exhaustively classified by the pupils' own ordering of these activities.

3. The shared cognitive map gives credence to the former idea that pupils in an elementary school think as a group, while the idea that they behave as a group received only partial support from the behavior observation study results. Overall, the results suggest that attempts to understand pupils as a group will be most fruitful when the investigator queries pupils about events and things in the school environment and less fruitful if only their behavior is observed or if only some standardized opinionnaire is used.

4. Open-ended, loosely structured interviews with a few "informants" can tell us something about the culture of the group as a whole. Based on my study, I would be willing to conduct such interviews in several different schools and compare the results, even without the validation procedures that I used here. There is striking evidence that all pupils, at least across a span of two grades, construct the same reality, and therefore, that interviewing a few accomplishes nearly as much as interviewing all of them.

5. Our collective ignorance of schools is such that it is possible for a researcher to enter a school with a very open agenda and come out with a few discoveries. Beyond the desire to observe pupils and understand their beliefs about school life, I had few other plans. The situation itself largely dictated the steps I took and the methods I employed. It was possible to gradually focus the investigation and to begin asking some pointed questions.

Essentially the ideas that motivated this project were reasonable enough. This work then represents small advances in our understanding of school life as a culture, of belief systems and the relationship between beliefs and behaviors, and of the nature of an experimental school. These results will take on more value as we learn more about the experimental school. One interesting extension would be to query teachers about school life using some of these same methods. Just such a study is planned for Longbranch.

Reference Notes

1. Lancy, D. F., & Resnick, L. B. *Studying the subculture of [illegible] an ethnoscientific approach.* Paper presented at the meeting of the Society for Cross-Cultural Research, Chicago, February 1975.

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APPENDIX A

Code for Pupil Behavior Observation Schedule

1. Date, Time, Homeroom Teacher, Place, and Pupil's Name (surname) will all be written in before the observation session begins.

2. Location: The code for location is found on the bottom of the observation schedule.

A = at seat; the child is sitting or standing by his/her seat.

B = traveling; the child is located somewhere in the room not covered by the other codes or is moving around, out of or into a room.

C = on the floor, at play table.

D = at teacher's desk.

E = tape table; child is sitting at or standing by the bench/table which holds the tape players.

F = periphery; the child is standing near or moving along one of the walls in the room.

G = out of the room.

3. Group: This box is checked if the child is engaged in a group activity of some kind. The group is not a random cluster but is together for some purpose. Examples of groups include: three children playing a game, a child helping another with a lesson, two children making a poster, two children measuring each other for an assignment.

4. Working: The child is actively engaged in working on something connected with a subject or an extraordinary assignment from the teacher such as seatwork, a book review, writing sentences as punishment, etc. The observer will, therefore, see the child either reading, writing, typing systematically on the computer, manipulating materials in a Min-Ex or SA in science, or listening to a tape in spelling, IS, or LS & RS.

5. Getting: The child is actively engaged in getting something or going somewhere. Examples include getting a worksheet, punching the time clock, getting a tape, sharpening a pencil, taking a folder to the aide, getting or putting away

material in science, going up to the teacher for whatever reason, getting a game, getting coats to leave, going to the bathroom, getting art materials, etc.

6. Watching/listening to: The child watches and/or listens to a teacher (addressing the whole class), a peer or group of peers, a filmstrip, or a film. The code I is used to indicate that the watching or listening is related to instruction; O is used otherwise.

7. Daydreaming: This is coded when the child seems to be staring off into space not looking at anything in particular during the entire observation period.

8. Talking: I. The child is talking to the teacher, an aide, or a peer about his/her work, or the child is listening to same. This does not include those occasions when the child is listening to the teacher address the entire class or those occasions when the child is addressing the entire class. O. Same as above when unrelated to work.

9. Helping: The child is helping when he/she voluntarily engages in an activity which achieves some goal established by and for someone else. Helping the teacher includes running errands, cleaning the boards, passing out folders, etc. Helping a friend is difficult to code because the coder must be aware of the antecedent circumstances. If a child is interacting with another child, talking with peer is checked; further information is necessary before the coder makes a judgment as to whether the conversation is instructional in content (I) or other (O). Even more information is needed to make the judgment that the child is helping a peer.

10. Playing: The child is engaged in a play activity, specifically, playing a game, playing with an animal, or building a puzzle. If the child is engaged in any one of these activities and is castigated for doing so by peers or teachers, a check should, rather, be placed in the "other" box because this activity is "fooling around." This is likely to happen if the child is playing when he/she is supposed to be working or if the child is playing in a disruptive way, for example, building a tower of dominoes and then knocking it down.

11. Making: Any construction activity that the child engages in is making, such as making a picture, a poster, a bulletin board. Making also occurs in science as when children make things during their self-selected period with tinkertoys, batteries, plaster-of-paris, etc.

12. Other: This code is used for Fooling Around and is a broad category that includes many items: (a) bugging or bothering another child or the teacher--the child physically or verbally tries either playfully or maliciously to antagonize another

person; (b) unsanctioned play--this is play that is noisy, disruptive, or falls when the child should be working or has not finished his/her work; (c) activities that are deliberately aimed at making a mess with paints, with paper, scribbling, doodling, etc.; (d) play-like activities that do not fit into the playing category (because they are not playing a game, building a puzzle, or playing with an animal) such as throwing spitballs or paper airplanes, running or skipping in the hallway, fighting, wrestling, etc. Observers should attempt to write in the space what the child is doing if this box is checked.

13. Unidentified: A check should be placed in this box if the child is waiting for someone or something. This most often happens when the child is waiting for the teacher to help him/her to answer a question. This box should not be checked if the child is engaged in any other activity, even though the observer may have noticed that the child is waiting.

14. By and large, these categories code overt behavior. The only cases where a judgment of intention must be made are in the categories of helping and in those categories which must be coded as I or O. Furthermore, the coder rates the first behavior he sees at the onset of the 10-second interval so that a child returning to his seat at t_1 is coded as getting, even if he is working at t_2. Location is coded every time, regardless of activity.